



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/080,295

02/21/2002

David A. Dalman

MIC35 P-326

8834

277

7590

06/17/2004

PRICE HENEVELD COOPER DEWITT & LITTON, LLP
695 KENMOOR, S.E.
P O BOX 2567
GRAND RAPIDS, MI 49501

EXAMINER

MUTSCHLER, BRIAN L

ART UNIT

PAPER NUMBER

1753

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/080,295

Applicant(s)

DALMAN ET AL.

Examiner

Brian L. Mutschler

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-3,6-10,20-27 and 33-35 is/are allowed.
- 6) ☒ Claim(s) 11-19,29-31 and 36 is/are rejected.
- 7) ☒ Claim(s) 4,5,28 and 32 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 20020221.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claims 29 and 31 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 29 recites the limitation "wherein deposition of the electrically conductive material on the selected [surface] of the dielectric substrate is achieved by direct printing of a coating composition...." Since the process for the deposition of the electrically conductive material on the selected surface of the dielectric substrate is the process being claimed, the limitations of claim 29 appear to supersede all of the limitations of the independent claim and therefore do not further limit the parent claim. It is suggested that the phrase "wherein deposition of the electrically conductive material on the selected [surface] of the dielectric substrate is achieved by" be changed to --wherein depositing the radially-layered dendritic copolymer is achieved by-- to properly identify the recited limitations as a further limitation of the copolymer deposition step.

Claim 31 similarly recites the limitation "wherein deposition of the electrically conductive material on the selected [surface] of the dielectric substrate is achieved by selectively sorbing the metal cations." As explained above, this format appears to supersede the limitations that comprise the process described in the parent claim. It is suggested that the phrase "wherein deposition of the electrically conductive material on

Art Unit: 1753

the selected [surface] of the dielectric substrate is achieved by" be changed to --wherein sorbing metal cations into the cross-linked dendritic polymer network is achieved by--.

2. Claims 4, 5, 12, 15, 17, 28-30, and 32 are objected to because of the following informalities:

- a. In claim 4 at line 2, please include the names of the compounds represented by PAMAMOS and PAMAM, e.g., poly(amidoamine) organosilicon and poly(amidoamine), respectively.
- b. In claim 5 at lines 1 and 2, please include the names of the compounds represented PPIOS and PPI, e.g., poly(propyleneimine) organosilicon and poly(propyleneimine), respectively.
- c. In claim 12 at line 3, please delete "in these other groups".
- d. In claim 12 at line 4, please insert --and-- before "R".
- e. In claim 15 at line 2, please include the name of the compound represented by PAMAM.
- f. In claim 15 at line 6, please delete "in these other groups".
- g. In claim 15 at line 7, please insert a semicolon (";") after "1-6".
- h. In claim 17 at line 2, please include the name of the compound represented by PPI.
- i. In claim 17 at line 6, please delete "in these other groups".
- j. In claim 17 at line 7, please insert a semicolon (";") after "1-6".

- k. In claim 28 at line 2, please change "selected surfaces" to --the selective surface-- because the independent claim recites a singular surface.
- l. In claim 29 at lines 2 and 3, please change "surfaces" to --surface--.
- m. In claim 30 at line 2, please change "surfaces" to --surface--.
- n. Claim 32 depends from claim 1. However, since claim 1 does not recite "selective sorption of metal cations", it appears that claim 32 should depend from claim 31, which properly introduces the limitation of selective sorption.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11-19, 29-31, and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 is indefinite because the terms R and R' are not defined. The same applies to dependent claim 13, which similarly uses R in a chemical formula without identifying R. The rejection applies to dependent claims 12 and 13.

In claim 12 at line 4, the term R' is defined, but R' never appears in the formulas recited in claims 11 or 12. Therefore, the limitations of the claim are indefinite because the relationship between R' and the process is undefined.

In claim 14 at line 5, the presence of the term "etc." renders the claim indefinite because the scope of the term is undefined.

In claim 15 at line 7, the term R' is defined, but R' never appears in the formulas recited in the claims. Therefore, the limitations of the claim are indefinite because the relationship between R' and the process is undefined. The same applies to dependent claim 16.

In claim 17 at line 7, the term R' is defined, but R' never appears in the formulas recited in the claims. Therefore, the limitations of the claim are indefinite because the relationship between R' and the process is undefined. The same applies to dependent claim 18.

In claim 19 at line 2, the chemical compound lists R as a constituent, but what R represents is not defined.

Claim 29 recites the limitation "wherein deposition of the electrically conductive material ... is achieved by direct printing of a coating composition containing the radially-layered dendritic copolymer to the selected [surface] of the substrate." As explained above in section 1, the limitation modifies the entire process instead of the individual step of depositing the radially-layered dendritic copolymer. Therefore, the relationship between the direct printing of the copolymer in claim 29 and the deposition of the copolymer in claim 1 is unclear. The change suggested above would clarify the relationship by having the direct printing step of claim 29 clearly modify the copolymer deposition step of claim 1. The same applies to dependent claim 30.

Claim 31 recites the limitation "wherein depositing of the electrically conductive material on the selective [surface] of the substrate is achieved by selectively sorbing the metal cations." As explained above in section 1, the limitation modifies the entire process instead of the individual step of sorbing metal cations. Therefore, the relationship between the selective sorbing in claim 31 and the sorbing of claim 1 is unclear. The change suggested above would clarify the relationship by having the selective sorption step of claim 31 clearly modify the sorption step of claim 1.

Claim 36 recites the limitations "the copper nanocomposite" in lines 2-3 and "unwanted copper nanocomposite" in line 5. There is insufficient antecedent basis for this limitation in the claim. Claim 1 merely recites a metal nanocomposite. Therefore, it is suggested that proper antecedent basis for the copper nanocomposite be provided for the limitation.

Allowable Subject Matter

5. Claims 1-3, 6-10, 20-27, and 33-35 are allowed.
6. Claims 4, 5, 11-19, 28-32, and 36 would be allowable if rewritten to overcome the objections and/or rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
7. The following is a statement of reasons for the indication of allowable subject matter:

The instant claims are allowable over the prior art of record because they provide a combination of steps for selectively depositing an electrically conductive material on a surface of a dielectric substrate comprising the steps of forming a nanocomposite composition formed by reducing metal cations sorbed into a cross-linked dendritic polymer network formed of a radially-layered dendritic copolymer having a hydrophilic interior and a hydrophobic exterior and electroplating a metal on the nanocomposite. This process is neither taught nor disclosed by the prior art of record.

The dendritic copolymers have been disclosed in U.S. Pat. Nos. 5,739,218; 5,902,863; 5,938,934; and 6,077,500. However, these references neither teach nor suggest the use of such dendritic polymers as a seed layer for subsequent electroplating. From the teachings of U.S. Pat. No. 5,334,292 (Rajeshwar et al.), it is further known that metal cations sorbed into a polymer can be reduced to form a conductive polymer-based layer. However, Rajeshwar et al. neither electroplate on the conductive polymer-based layer nor teach the use of dendritic copolymers having a hydrophilic interior and a hydrophobic exterior as recited in the instant claims.

Dendritic polymers used in deposition processes are disclosed in U.S. Pat. No. 6,682,642 (Mikkola et al.) and U.S. Pat. No. 6,248,668 (Beebe et al.). However, Mikkola et al. only teach using dendritic polymers as an additive in electroplating baths. Beebe et al. teach the use of dendritic polymers as a sacrificial release layer, wherein metal layers are formed on the surface of the dendritic polymer and nickel is electroplated on those metal layers. Neither of these references suggests the combination of steps recited in the instant claims.


Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (571) 272-1341. The examiner can normally be reached on Monday-Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BLM
June 9, 2004


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700